

What is claimed is:

1. A method for manufacturing a reflection type liquid crystal display including:

5 a process of forming plural scanning lines and plural signal lines crossing said scanning lines on an insulating substrate and forming a switching element in each of picture element regions divided by said scanning lines and said signal lines;

10 a process of forming an interlayer insulating film having appropriate unevenness of an inseparable pattern in the picture element region and having a contact hole of a separable pattern on a drain electrode of said switching element by plainly applying a photosensitive insulating resin on said substrate so as to dissolve difference in level caused by said scanning  
15 lines, said signal lines, said switching element, and so on, and conducting exposure and development while changing an amount of exposure; and

a process of forming a reflex picture element electrode having unevenness due to said interlayer insulating film at a  
20 position conforming to each of picture element regions and which is electrically connected to said switching element through said contact hole, by patterning after forming a high reflex film such as Al film on said interlayer insulating film.

2. The method for manufacturing a reflection type liquid  
25 crystal display according to claim 1, wherein in the process

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of forming the interlayer insulating film, the insulating resin is exposed by divisional (split) exposure in which the inseparable pattern and the separable pattern are arranged on different masks, and said inseparable pattern is exposed by a  
5 predetermined exposure amount of 20 to 80 % of the exposure amount for said separable pattern.

3. The method for manufacturing a reflection type liquid crystal display according to claim 1, wherein in the process of forming the interlayer insulating film, the masks used in  
10 exposing the insulating resin have a shading material comprised of at least two layers including an ultraviolet filter layer for cutting ultraviolet rays at a predetermined value of 20 to 80 % in a base material such as glass, and said ultraviolet filter layer is laid in a mask pattern opening portion located  
15 conforming to the picture element region.

4. A reflection type liquid crystal display manufactured according to any of claims 1 to 3.

5. A mask for manufacturing a reflection type liquid crystal display comprising:

20 a first insulating substrate provided with scanning lines and signal lines formed into a lattice configuration, a TFT, an interlayer insulating film, a reflex picture element electrode, and so on;

a second insulating substrate which is provided with a  
25 color filter, an opposed electrode and so on, and is arranged

to be opposite to the first insulating substrate; and

a liquid crystal put between said substrates;

wherein the reflection type liquid crystal display further comprises a shading material of at least two layers including an ultraviolet filter layer for cutting ultraviolet rays at a predetermined value of 20 to 80 % in a base material such as glass, said ultraviolet filter layer being laid in a mask pattern opening portion located conforming to a picture element region.

10 6. The mask for manufacturing a reflection type liquid crystal display according to claim 5, wherein an a-Si film is used as the ultraviolet filter layer and a Cr/CrOx film is used as the shading material for completely shading the ultraviolet rays.

15 7. A reflection type liquid crystal display comprising:  
an insulating substrate;  
scanning lines, a scanning electrode, and common electrode wiring formed on said insulating substrate;  
an insulating film formed on said scanning lines, said  
20 scanning electrode and said common electrode wiring;  
a semiconductor layer formed on said scanning electrode through said insulating film;  
a first electrode and a second electrode forming a semiconductor element with said semiconductor layer, and signal  
25 lines connected to said first electrode;

an interlayer insulating film which is formed on said first electrode, said second electrode and said signal lines, absorbs difference in level of said scanning lines, said first electrode, said second electrode and said signal lines, and possesses minute unevenness on the surface;

a first substrate having a reflex picture element electrode composed of a high reflex metal film having a configuration transferred to said interlayer insulating film as the unevenness on the surface of said interlayer insulating film and electrically connected to said second electrode through a contact hole provided in said interlayer insulating film; and

a second substrate sandwiching and holding a liquid crystal material with said first substrate;

wherein said insulating substrate is processed not to permit any ultraviolet light to transmit therethrough.

8. The reflection type liquid crystal display, wherein the insulating substrate is processed so that the entire surface does not permit any ultraviolet light to transmit therethrough.

9. The reflection type liquid crystal display, wherein the insulating substrate is processed so that a display portion does not permit any ultraviolet light to transmit therethrough.

10. The reflection type liquid crystal display, wherein the insulating substrate is processed not to permit any ultraviolet light to transmit therethrough by forming an

ultraviolet light absorption film on one face or both faces of a transparent insulating substrate or between two transparent insulating substrates.

11. The reflection type liquid crystal display, wherein  
5 the insulating substrate is processed not to permit any ultraviolet light to transmit by forming an ultraviolet light cut film on one face or both faces of a transparent insulating substrate or between two transparent insulating substrates.

12. The reflection type liquid crystal display, wherein  
10 the insulating substrate is composed of transparent or colored ultraviolet-cut glass.

13. A reflection type liquid crystal display comprising:  
a transparent insulating substrate;

scanning lines, a scanning electrode, and common  
15 electrode wiring formed on said insulating substrate;

an insulating film formed on said scanning lines, said scanning electrode, and said common electrode wiring;

a semiconductor layer formed on said scanning electrode through said insulating film;

20 a semiconductor film composed of the same film as said semiconductor layer;

a first electrode and a second electrode forming a semiconductor element with said semiconductor layer, and signal lines connected to the first electrode;

25 an interlayer insulating film which is formed on said

first electrode, said second electrode and said signal lines, absorbs difference in level of the scanning lines, first electrode, second electrode and signal lines, and possesses minute unevenness on the surface;

- 5           a first substrate having a reflex picture element electrode composed of a high reflex metal film having a configuration transferred to the interlayer insulating film as the unevenness on the surface of said interlayer insulating film and electrically connected to said second electrode through a
- 10          contact hole provided in the interlayer insulating film; and
- a second substrate sandwiching and holding a liquid crystal material with said first substrate;

            wherein said semiconductor film is formed in a picture element region excluding the region where said scanning lines, said signal lines, and said the contact hole are formed.

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14. A method for manufacturing a reflection type liquid crystal display according to the invention, wherein two transparent insulating substrates, in which an electrode is formed on at least one of them, are arranged to be opposite and adhered to each other and a liquid crystal material is held between said two transparent insulating substrates, the method including:

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            a process of forming an ultraviolet light absorption film or an ultraviolet light cut film such as a metal film and an insulation layer on one of said two transparent insulating

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substrates;

a process of forming scanning lines, a scanning electrode, and common electrode wiring on one face side or the opposite face side of said transparent insulating substrate where the ultraviolet light absorption film or the ultraviolet light cut film such as a metal film and the insulation layer are formed;

a process of forming an insulating film on said scanning lines, said scanning electrode and said common electrode wiring;

10 a process of forming a semiconductor layer on the scanning electrode through the insulating film;

a process of forming a first electrode and a second electrode forming a semiconductor element with said semiconductor layer and forming signal lines;

15 a process of forming an interlayer insulating film having a contact hole at a predetermined position and desired unevenness on the surface by applying photosensitive resin on said first electrode, said second electrode, and said signal lines, and conducting exposure and development; and

20 a process of forming a reflex picture element electrode having a configuration of the transferred unevenness on the surface of said interlayer insulating film and electrically connected to the second electrode through said contact hole by forming a high reflex metal film on said interlayer insulating film and in said contact hole, and conducting patterning.

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15. A method for manufacturing a reflection type liquid crystal display wherein ultraviolet-cut glass and a transparent insulating substrate, in which an electrode is formed on at least one of them, are arranged to be opposite and adhered to each other and a liquid crystal material is held between said ultraviolet-cut glass and said transparent insulating substrate, the method including:

a process of forming scanning lines, a scanning electrode, and common electrode wiring on said ultraviolet-cut glass;

a process of forming an insulating film on said scanning lines, said scanning electrode and said common electrode wiring;

a process of forming a semiconductor layer on said scanning electrode through said insulating film;

a process of forming a first electrode and a second electrode forming a semiconductor element with said semiconductor layer, and forming signal lines;

a process of forming an interlayer insulating film having a contact hole at a predetermined position and desired unevenness on the surface by applying photosensitive resin on said first electrode, said second electrode and said signal lines, and conducting exposure and development; and

a process of forming a reflex picture element electrode having a configuration of the transferred unevenness on the surface of the interlayer insulating film and electrically



connected to said second electrode through said contact hole by forming a high reflex metal film on said interlayer insulating film and in said contact hole, and conducting patterning.

- 5           16. A method for manufacturing a reflection type liquid crystal display wherein two transparent insulating substrates, in which an electrode is formed on at least one of them, are arranged to be opposite and adhered to each other and a liquid crystal material is held between said two transparent
- 10 insulating substrates, the method including:

          a process of forming scanning lines, a scanning electrode, and common electrode wiring on one of said two transparent insulating substrates;

- a process of forming an insulating film on said scanning
- 15 lines, said scanning electrode, and said common electrode wiring;

          a process of forming a semiconductor layer on said scanning electrode through said insulating film;

- a process of forming a first electrode and a second
- 20 electrode forming a semiconductor element with said semiconductor layer, and forming signal lines;

          a process of applying photosensitive resin on said first electrode, said second electrode, and said signal lines;

- a process of sticking an ultraviolet-cut film on a face
- 25 of the transparent insulating substrate opposite to the face

where said photosensitive resin is applied;

a process of exposing said photosensitive resin;

a process of forming an interlayer insulating film having  
a contact hole at a predetermined position and desired  
5 unevenness on the surface by applying a development after  
exfoliating said ultraviolet-cut film; and

a process of forming a reflex picture element electrode  
having a configuration of the transferred unevenness on the  
surface of said interlayer insulating film and electrically  
10 connected to said second electrode through said contact hole  
by forming a high reflex metal film on said interlayer  
insulating film and in said contact hole, and conducting  
patterning.

17. A method for manufacturing a reflection type liquid  
15 crystal display wherein two transparent insulating substrates,  
in which an electrode is formed on at least one of them, are  
opposed and adhered to each other and a liquid crystal material  
is held between said two transparent insulating substrates, the  
method including:

20 a process of forming scanning lines, a scanning electrode,  
and common electrode wiring on one of said two transparent  
insulating substrates;

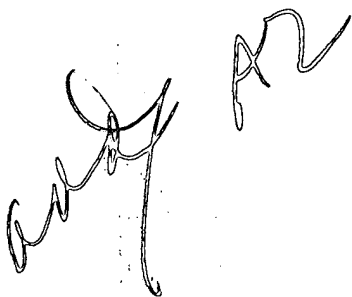
a process of forming an insulating film on said scanning  
lines, said scanning electrode and said common electrode  
25 wiring;

a process of forming a semiconductor layer on said scanning electrode through said insulating film, and forming a semiconductor film in a predetermined region;

a process of forming a first electrode and a second  
5 electrode forming a semiconductor element with said semiconductor layer, and forming signal lines;

a process of forming an interlayer insulating film having a contact hole at a predetermined position and desired unevenness on the surface by applying photosensitive resin on  
10 said first electrode, said second electrode and said signal lines, and conducting exposure and development; and

a process of forming a reflex picture element electrode having a configuration of transferred unevenness on the surface of said interlayer insulating film and electrically connected  
15 to said second electrode through said contact hole by forming a high reflex metal film on said interlayer insulating film and in said contact hole, and conducting patterning.

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